Administrative Report (FY 2003) and Workplan (FY 2004)
for Biological Inventories and Vital Signs Monitoring

Mediterranean Coast Network

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I. Overview and Objectives

The Mediterranean Coast Network (MEDN) is composed of three parks in coastal southern California: Cabrillo National Monument (CABR), Channel Islands National Park (CHIS), and Santa Monica Mountains National Recreation Area (SAMO). These parks protect and manage an increasingly rare example of a Mediterranean coastal ecosystem. Inventorying the diversity of plants and animals in the Mediterranean Coast Network is the first critical step in protecting and managing network ecosystems. The long-term monitoring of selected park resources to determine the range of normal ecosystem variation and provide an indication of ecosystem health, will follow the completion of resource inventories and will meld with existing monitoring programs already implemented in the parks.

This document reports on FY 2003 accomplishments and outlines the FY 2004 workplan for the network Inventory and Monitoring Program. All existing monitoring activities for SAMO and CABR are included whether they were fully or partially funded through the service-wide I&M program. Some I&M-related activities (e.g. SAMO vegetation mapping, small mammal surveys at CABR and SAMO) were not funded through the I&M program, but have been included in this report.

Biological Inventories

In fiscal year 2000, using funds provided through the National I&M program, the MEDN began an inventory of vascular plants and vertebrate species. In the first year, the network collected existing inventory information; held a scientific workshop to assess the parks' biological knowledge, identify remaining gaps, and discuss how to fill those gaps; and developed a study plan to complete park inventories within five years. The following year, FY 2001, the network continued collection of existing species inventory information and initiated fieldwork to inventory reptiles and amphibians. In FY 2002, the network began an inventory of reptiles and amphibians for CHIS and initiated inventories of bats, exotic plant species, and rare plant species in all three parks. The collection of pre-existing inventory information was largely completed. Work on the exotic plant species and rare plant species inventories at the three network parks continued in FY 2003, as did the bat inventory at SAMO and the bat and herpetofauna inventories at CHIS. In FY 2004, there will be no new funding for biological inventories. However, some inventories will continue using FY 2004 monitoring, park base, and regional project funds, as well as funds committed in earlier years through cooperative agreements and contracts.

Objectives for Biological Inventories:

1. Compile and evaluate existing data for each park and enter into NPS databases.
2. Complete the documentation of 90% of vertebrate and vascular plant species in the parks and describe the distribution and relative abundance for species of special management concern through targeted field investigations.

Vital Signs Monitoring

In FY 2001, the network received funding to plan and initiate a Vital Signs monitoring program. These planning funds were used to supplement existing monitoring programs at CABR and SAMO (CHIS' monitoring program was funded earlier through the I&M Prototype program) and, through a cooperating agency, to support a Vital Signs workshop for the Santa Monica Mountains. This workshop took place in December 2002. A network coordinator was hired in late FY 2002.

In FY 2003, network staff concentrated on completing the Phase II Report. Vital Signs workshops were held at SAMO and CABR. Findings from these workshops were summarized and used to produce lists of candidate vital signs which were later prioritized in a web-based exercise. The prioritized list was used by network and park technical staff to select Vital Signs for protocol development and monitoring. At the same time, protocols for ongoing terrestrial herpetofauna and stream monitoring were submitted for additional peer review and approval by the National I&M Program. In FY 2004, primary activities will be related to the detailed design work needed to implement monitoring, resulting in a complete draft of the monitoring plan (Phase III Monitoring Report). The herpetofauna and stream monitoring will be continued.

Objectives for Vital Signs Monitoring:

3. Hire and retain professional staff to support network I&M planning and implementation.
4. Develop and implement network organizational structure and decision-making processes that engage park technical staff and managers.
5. Implement and maintain an integrated GIS and data management program.
6. Design an integrated network Vital Signs monitoring program.
7. Support ongoing inventory and monitoring activities consistent with Vital Signs. Conduct prototype monitoring program at CHIS. Implement network Vital Signs Monitoring.
8. Develop and implement strategies to share information with network parks, scientists, and others interested in the network's I&M program.

Water Quality Monitoring

Additionally, in FY 2001 a water quality monitoring work plan was developed to address the overall objective of the design and implementation of a Water Quality Monitoring Program. In this plan, the network identified several major steps: (1) Collect, compile, and evaluate known information about fresh, estuarine, and marine water resources and water quality monitoring among the network parks; (2) Support and/or complete ongoing baseline water quality data collection in the network parks, specifically at SAMO and CHIS; (3) Develop a long-term strategy to implement appropriate water quality monitoring programs, including consideration of existing efforts from cooperating agencies across the network and the provision of NPS staff and resources to coordinate and manage such a strategy.

Initial funding (received in FY 2001) was used to support the first two steps, while FY 2002 funding allowed the network to work on all three steps with the goal of implementing a long-term water quality monitoring program. Collection and evaluation of existing data is ongoing. This effort will culminate in network water quality monitoring workshop to be held in the second quarter of FY 2004. Plans to hire a Water Quality Monitoring Coordinator are on hold after the hiring of two regional water resources positions. The network will solicit input at the workshop on whether to hire this position or use the funding in another way (e.g. support already established water quality monitoring programs, fund field technicians, etc.) The network receives $76,000 annually from the Water Resource Division to support water quality monitoring.

Additional Objectives for Water Quality Monitoring:

9. Design and implement network Water Quality Monitoring Program

Other Natural Resource Inventories

At current national funding levels, the parks in the Mediterranean Coast Network are not scheduled to receive I&M Program funding for vegetation mapping for many years. However, in the interim, network parks are seeking other sources of funds to complete this critical inventory. And, as a result of heightened public and political awareness of fire hazard issues at the wildland-urban interface, a vegetation/fire fuels map for SAMO was funded largely by the National Fire Program. The project ran into financial difficulties in FY 2003 when the NPS Fire Management Office decided to discontinue funding. SAMO has secured external funding to cover remaining field work and is currently seeking additional funds for map automation to complete this critical inventory need.

Objectives for Other Natural Resource Inventories:

10. Complete SAMO Vegetation/Fuels Map following I&M program standards, procedures and guidelines.

II. Accomplishments (FY 2003) and Scheduled Activities (FY 2004)

A. Biological Inventories

Objective 1 – Compile and evaluate existing data for each park and enter into NPS databases.

Task 1.1 – Review and compile existing information on plants (all parks).

FY 2003 Accomplishments:

a) The final report and database for the Santa Monica Mountains Flora was submitted by Dr.'s Gibson and Prigge of UCLA in July. The final report was posted to the network I&M web site. The researcher's compiled 36,000 plant records (collections and sightings) for the Santa Monica Mountains and Simi Hills with an estimated error rate of less than 1%. The UCLA researchers will continue to provide us with updates as they edit and expand the database while developing a revised the Santa Monica Mountains Flora for publication. The database compilation was assisted by NPS biotechnicians Tarja Sagar, Eilene Berbeo and Antonio Solorio, who spent 233 hours performing UCLA herbarium searches, environmental impact report surveys and data entry.
b) Vegetation survey results, including rare taxa, invasive weeds and new abundance information were entered into the NPSpecies database for CHIS. As the backlog of vascular plant voucher specimens were processed, new finds, records for specimens not previously or not recently collected were added to the NPSpecies database. The Gary Wallace database, representing over 10 years of voucher specimen searches at various herbaria for Channel Islands plant species, was converted to MSExcel format. Records from Channel Islands National Park will be published as a web-accessible document through the NPS data dictionary currently under development and testing at the national level. Portions of the database pertinent to other California Channel Islands (e.g., Santa Catalina) were shared with staff from those locations. The entire multi-island database is kept intact in the Channel Islands National Park/USGS-BRD Channel Islands Field Station Inventory database.
c) Abundance values were derived for the Cabrillo National Monument vascular plant species list using vegetation monitoring data, observations from herbarium labels, and field observations. The complete vascular plant species list with estimated abundances was added to the NPSpecies database. USGS-BRD provided technical support to Cabrillo staff as they conducted vegetation monitoring for the park in Spring 2003.

Scheduled FY 2004 Activities and Products:

d) Continue work on the flora revision for SAMO as funds and schedules allow. In FY 2004 we hope to supplement the database with a survey of the Rancho Santa Ana Botanic Garden herbarium.
e) Seek additional funds to support publication of the revised flora.
f) Continue data entry into NPSpecies and other NPS databases with parks, contractors, and cooperators as necessary.

Task 1.2 – Identify, collect and process voucher specimens (all parks).

FY 2003 Accomplishments:

a) Eighty-eight voucher specimens from the Santa Monica Mountains and Simi Hills were mounted by contractor Jennifer Weist. These included both new species occurrences and noteworthy occurrences of already documented species. The mounted specimens were accessioned into the UCLA herbarium to supplement those in the existing Santa Monica Mountains flora collection. Additional collections will be made as needed to ensure acceptable voucher specimens exist for all species listed in the update of the Santa Monica Mountains Flora.
b) The nearly ten-year backlog of unprocessed vascular plant voucher specimens for CHIS were organized, labels were made, the specimens were verified by the appropriate taxonomists, and the specimens were sent to the Santa Barbara Botanic Garden (SBBG) for accessioning. Duplicate specimens were sent to cooperating herbaria by SBBG. New finds, records for specimens not previously reported, and records for taxa not recently collected were added to the NPSpecies database.

Scheduled FY 2004 Activities and Products:

c) Continue processing CHIS vouchers and deposit at SBBG for accessioning into the herbarium collection.
d) As part of the continuing flora update, additional collections will be made as needed to ensure acceptable voucher specimens exist for all species listed in the update of the Santa Monica Mountains Flora.

Task 1.3 – Document bird species checklists (all parks).

FY 2003 Accomplishments:
Miscellaneous minor additions and updates were made to NPSpecies records for all parks.

Scheduled FY 2004 Activities and Products:
Coordinate data entry into NPSpecies and other NPS databases with parks, contractors, and cooperators as necessary.

Task 1.4 – Review and compile existing information on fish (all parks).

FY 2003 Accomplishments:
Miscellaneous minor additions and updates were made to NPSpecies records.

Scheduled FY 2004 Activities and Products:
Coordinate data entry into NPSpecies and other NPS databases with parks, contractors, and cooperators as necessary.

Objective 2 – Complete the documentation of 90% of vertebrate and vascular plant species in the parks and describe the distribution and relative abundance for species of special management concern through targeted field investigations.

Task 2.1 – Rare, threatened, or endangered plant species surveys (all parks) and Invasive exotic plant species surveys (all parks).

FY 2003 Accomplishments:

a) The vegetation of Santa Cruz Island was sampled in 369 releve plots during the 2002 and 2003 growing seasons. Objectives of the study are to develop a vegetation classification for the island, along with an assessment of the distribution and abundance of weedy exotic and native plants across communities and habitats. At each plot, data were collected on plant community type, stand size and adjacency; animal and anthropogenic disturbance; slope, aspect, elevation, slope shape and landscape position; cover of individual plant taxa, plant strata and substrates; and other taxa present within the stand outside of the plot area. Each plot was marked with an aluminum stake, locations were recorded with hand-held Garmin eTrex Vista Global Positioning System (GPS) units, and photographs of the plot, stand and approach routes were taken with digital cameras. The data are stored in MSAccess and ArcView databases at the Channel Islands National Park/USGS-BRD Field Station.

   Study sites were selected using a stratified-random sample design. ArcView Geographic Information System (GIS) software was used to delineate eleven higher-level watersheds. Then an ArcView extension was used to allocate a random selection of 455 potential sampling locations among watersheds in proportion to watershed area. We navigated to the sites in the field utilizing Garmin eTrex Vista Global Positioning System (GPS) units uploaded with the GIS-selected coordinates and printed GIS aerial photo/maps with the sample location marked. The accuracy of the GPS units was generally 4-6 meters. We collected GPS waypoints at each plot, and along an approach route to the plot. Waypoints were downloaded into text files using Waypoint+ software, then moved into MS Excel for editing. The waypoint data were converted back to a text file for import into the GIS, then converted to an ArcView shapefile. The MS Access and ArcView databases were linked, allowing us to pose queries and display the results visually in a GIS view.

   A vegetation classification at the series level is being made for the island in 2003 and 2004. This classification will be used as the basis for a new aerial-photo-based vegetation map for the island, in a cooperative project between USGS-BRD and The Nature Conservancy. The MSAccess/ArcView GIS database will be used to model the occurrence of exotic plants, plant communities, species and species guilds across the landscape. These models will be employed as one of the base layers for design of an island-wide vegetation monitoring program in 2003-2004. Results will also be used to plan a new weed control program for the island funded through USFWS and the Santa Barbara County Weed Management Area, 2003-2005.

b) Population and habitat surveys were made for three listed taxa of Santa Cruz Island: *Malacothrix indecora* (Santa Cruz Island chicory), *Thysanocarpus conchuliferus* (Santa Cruz Island lace-pod), and *Helianthemum greenei* (island rushrose). Habitat of the only known population of *M. indecora* was surveyed, but no plants were seen. Six of eight known populations of *T. conchuliferus* were re-surveyed. Five populations had no plants, one population had plants, and three new populations were found in suspected, but previously un-surveyed sites. The three extant populations of *H. greenei* were confirmed, and eleven new

occurrences were located. The knowledge base developed in 2002-2003 was used to formulate proposals to NPS for continuing demographic monitoring in 2004-2006 (funded, NPS-Channel Islands National Park), and outplanting recovery research (funded 2005-2006, NPS NRPP). A cooperative agreement was made with the Northern Arizona University Colorado Plateau CESU for continued collaborative vegetation and rare plant monitoring work.

c) Contractor Dossey and Associates of Encinitas, CA. finished a thorough survey of rare and invasive exotic plants at CABR. The contractor mapped and plotted individuals and infestations of exotic plant species and mapped all rare plant distributions in the park. All rare plant populations mapped in a 1998 study were relocated. Several additional locations were found. During the survey, Rod Dossey discovered an annual plant which he suspected could be one population of a species known from only a few locations on the mainland. After obtaining confirmation from the San Diego Natural History Museum, the plant was identified as the San Diego coastalcreeper (*Aphanisma blitoides*). This species is known from only one other location in San Diego County (M. Simpson, pers. comm. 2003) and otherwise has not been recently verified. There may be a few potential remnant populations farther north along the coast in the Los Angeles Basin; however, *A. blitoides* is confirmed on the Channel Islands (Navy and National Park Service, pers. comm.). A conservative estimate of the population located this year at Cabrillo NM is approximately 1,000 individuals. This is, by far, the largest known population on the mainland.
d) During 2003, one full-time and two part-time Biological Science Technicians surveyed a total of 33,500 acres within SAMO including 80% of major trails, 40% of major drainages, and adjacent wildland areas. These directed surveys have been supplemented by more generalized vegetation communities mapping. Two invasive species previously unreported from SAMO were found: *Centaurea repens* and *Chondrilla juncea*. Over 90% of the data have been entered into an Access database.
e) During 2003, the sensitive species targeted for inventory at SAMO were *Dudleya* sp., and *Pentachaeta lyonii*; other species have been surveyed opportunistically during *Dudleya*, *Pentachaeta*, invasive species and vegetation communities mapping efforts. As part of this survey, 57 locations were surveyed and confirmed to have sensitive *Dudleya* species. Out of these, 12 were new sites located based on knowledge of *Dudleya* habitat requirements. Facilitated by UCLA Mildred Matthias Botanic Garden Herbarium, chromosome counts were performed to clarify species designation for a population in an area with yet undescribed *Dudleya* spp. Because this was an exceptionally good year for flowering, 22 plots were established at six sites for the purposes of long-term demographic tracking that will begin next season. Over 60% of the data collect this year have been entered into an Access database. Data will be submitted to the California Natural Diversity Database.

Scheduled FY 2004 Activities and Products:

f) At CHIS, locations-lacking plants will be resurveyed in 2004-2006. Demographic studies tracking individuals in populations, plant size and fecundity will begin at selected sites in 2004, and two remaining listed taxa of Santa Cruz Island will be surveyed in 2004.
g) The rare plant survey will continue at SAMO. Focused inventories for additional rare species may be added as needed over the next season. Rare plants will be surveyed during their flowering time. In cooperation with UCLA Herbarium, we will perform chromosome

counts to clarify additional undescribed populations of *Dudleya*. *Dudleya* populations within the California State University Channel Island (CSUCI) campus will be surveyed in cooperation with CSUCI staff and students.

h) The exotic plant species surveys at SAMO will continue. The network will work with National Invasive Species Coordinator, Brad Welch, to ensure project will conform to national program expectations. During FY 2004, more attention will be given to supplementing the ongoing directed surveys along trails and roads with surveys targeting vegetation communities which tend to occur farther away from trails and roads. A GIS Intern is in the process of preparing an ArcView database to facilitate GIS analyses integrating invasive plant species information and rare, threatened, and endangered species information with environmental and habitat data layers. Another GIS Intern will be using the information to parameterize a predictive model for invasive species and rare species distribution developed by a UCSB researcher. The mountains-wide survey is anticipated to be completed by March 2004 and a report will be prepared by the end of the fiscal year.
i) Currently a GIS intern is compiling maps produced during the CABR rare and exotic plant survey. The maps are being converted to a digital format which will work for the park. By the end of the second quarter of FY 2004, the contractor will submit maps, GIS layers, and a final report to the park.
j) Enter data as needed into NPSpecies.

Task 2.2 – Riparian understory shrub and herbaceous plant species surveys (SAMO)

Scheduled FY 2004 Activities and Products:
This project is currently unfunded. The network will seek outside funding to implement this project.

Task 2.3 – Bat surveys (all parks)

FY 2003 Accomplishments:

a) Through Interagency Agreement with the USGS-BRD, San Diego Field Station, a year-round survey for bat species was completed to determine which species forage at, migrate through, or reside on Point Loma (CABR). Methods included acoustic scouting surveys and roost surveys for potential bat roosting sites (historic structures, caves, etc.). The survey has found species foraging incidentally in Point Loma or tree roosters using the cemetery site. Four species, previously unknown from Point Loma were detected. A total of eight species have now been recorded. A report including results, protocol, and recommendations has been submitted to the park.
b) A cooperative project with USGS-BRD, Colorado Plateau Field Station (Charles Drost, Principal Investigator) was initiated to inventory bat species for CHIS to identify species present, estimate abundance, and describe distribution.
c) SAMO staff, in cooperation with The Maturango Museum, sampled bat diversity and abundance at 22 different sites (some several times). Anabat detectors were used for acoustic sampling and mist nets were used to get animals in hand. While bat numbers at most sites have been low, we have captured eight species, including the first record of a red bat (*Lasarius borealis*) for the Santa Monica Mountains. In addition to the eight species

captured, we have detected one additional species, and may see more as we begin to analyze sound files.

Scheduled FY 2004 Activities and Products:

d) The inventory of bats on the Channel Islands will continue through agreement with USGS-BRD, Colorado Plateau Field Station. A report will be completed by the end of calendar 2004.
e) Park staff and cooperators are currently wrapping up field work and will meet the end of October to consolidate data and begin analysis for the SAMO bat survey. A report is expected by the end of FY 2004. Pat Brown, Robert Berry and Diane Simons (through the Maturango Museum) have been supervising the mist netting and will be completing the report.

Task 2.4 – Small mammal surveys (CABR and SAMO)

FY 2003 Accomplishments:

a) Field work on the CABR small mammal inventory was completed November 2003. This study was designed as a survey to scientifically confirm initial information collected during the herpetological surveys. There were no unexpected findings. Work was performed through cooperative agreement with San Diego State University (Professor James Diffendorfer, Ph.D.). The park received a draft version of the report in December 2003. The park staff will work with USGS to finalize this document. There have been significant delays in the completion of this project, but park staff are actively pursuing a final product and are confident that the final report will be completed during FY 2004. Although this project was included in the Biological Inventory Study Plan, no funding was allocated through the I&M program. The study was jointly funded through regional natural resource project funds and a cooperating association grant from the Cabrillo National Monument Foundation.
b) SAMO initiated a small mammal and lagomorph survey for both inventory information (species presence and distribution) and for information on diversity and abundance relative to urbanization and fragmentation. Grids of live traps are being used to capture small mammals and determine abundance in two small patches (less than 50 ha), two large patches (300-500 ha) and two contiguous park/core areas.

   Small mammal trapping began in Winter 2003. Based on preliminary results from the wet season, the small patches appear to be the least diverse. Only two species were caught in each site, while the two large patches each had five species and the core areas had five species and seven species. Pacific kangaroo rats (*Dipodomys agilis*) were found in this area and not found anywhere else. Trapping in the dry season has been radically different from the wet season because of the great increase in numbers of individuals. We have sampled two of the small patches and one of the core areas so far. In one of the small patches, we captured many Western harvest mice (*Reithrodontomys megalotis*) in the grass site and many wood rats (*Neotoma* spp.) in the sage, neither of which were found there during the wet season. At the second small patch we captured introduced house mice (*Mus musculus*) in the grass site, and while this fragment is small and entirely surrounded by urban areas, the

trapping grid is at least 200 meters into the open space. Abundance was also higher in the core area in the dry season, and we found a species there, the California pocket mouse (*Perognathus californicus*) that we hadn't found in the winter.

This project was included in the Biological Inventory Study Plan, but was unfunded. Some regional NPS natural resources funding has been secured.

Scheduled FY 2004 Activities and Products:

c) A final report on the CABR small mammal inventory, incorporating results, protocol, and recommendations will be submitted to the park in FY 2004.
d) With regional natural resource project funding, SAMO will continue the small mammal survey and expand it by measuring the abundance and density of ground squirrels, pocket gophers, and lagomorphs (rabbits). These species will be sampled with visual transects and/or pellet counts. The work is being led by a graduate student at California State University Los Angeles as part of a master's thesis. A final report will be completed by June 2005.

Task 2.5 – Small mammal and endemic carnivore studies (CHIS)

Scheduled FY 2004 Activities and Products:
This project is currently unfunded. The network will seek outside funding to implement this project.

Task 2.6 – Rare, sensitive, and island endemic bird species inventory (all parks)

Scheduled FY 2004 Activities and Products:
This project is currently unfunded. The network will seek outside funding to implement this project.

Task 2.7 – Breeding raptor inventory (CABR and SAMO)

FY 2003 Accomplishments:

a) The Breeding Raptor Inventory for SAMO and CABR was awarded to a private contractor in March, 2003. The contractor, Pete Bloom, and his technicians began field work shortly thereafter. Foot and road surveys for nest sites were conducted in all designated parkland. In addition, to assess cliff-nesting raptors in the Santa Monica Mountains, helicopter surveys were conducted for two days (approximately 10 hours) in May, 2002. Helicopter services and operations were managed by park staff. Data collected included nest location (GPS coordinates), species, nest structure (i.e. tree species), and presence of adults and/or young. Field work (approximately 500 hours) ended in September, 2003. Final nest location data and copies of field notes were submitted to SAMO for review.

b) At CABR, the survey was completed too late in the season and park staff feel additional surveys should be conducted earlier in the year. One high priority is a survey of the peninsula cliffs via boat to determine locations of cliff-dwelling raptor nests including one

known active peregrine falcon nest. No additional funding is available through the biological inventory program, but the network will seek other funds to accomplish these additional surveys.

Scheduled FY 2004 Activities and Products:

c) Currently, park staff is working with the contractor to compile and map the field data for the SAMO and CABR breeding raptor inventories. Preliminary survey data have been provided to the contractor for summary and analysis and a final report is expected in the second quarter of FY 2004.

Task 2.8 – Migratory bird inventory (all parks)

Scheduled FY 2004 Activities and Products:
This project is currently unfunded. The network will seek outside funding to implement this project.

Task 2.9 – Survey reptiles and amphibians (all parks)

FY 2003 Accomplishments:

a) At CHIS, the USGS-BRD Colorado Plateau Field Station initiated a survey of reptiles and amphibians to collect and analyze population information on distribution, relative abundance, and habitat occurrence of amphibian and reptile species on the islands within the National Park. In the initial months of the survey, researchers have tentatively added three bat species to the Santa Rosa Island list. Previously, California Myotis was the only species known from Santa Rosa, but the cooperators had found a single Townsend's Big-eared Bat (*Corynorhinus townsendii*) in a cave in Lobo Canyon during earlier work. They have not yet learned what the population and seasonal status of that species is on Santa Rosa, but believe there may be a small resident population. Additions from this year's survey work are Mexican Free-tailed Bat (*Tadarida brasiliensis*) and Hoary Bat (*Lasiurus cinereus*). These species may be migrants on the island or there could be small local populations. Researchers should be able to determine the status of these species in surveys planned for FY 2004.

b) Additionally, a new snake was discovered on Santa Rosa Island during the CHIS survey. Researchers are not certain of the species, but believe it to be the Aquatic Garter Snake (*Thamnophis atratus*). At the next opportunity, researchers will take a blood sample for genetic testing—both to confirm the species identification, and to evaluate its relationship to the mainland form.

Scheduled FY 2004 Activities and Products:

c) At CHIS, the USGS-BRD Colorado Plateau Field Station will continue the survey of reptiles and amphibians. Surveys will be conducted twice per month during the spring and summer through FY 2004. Survey methods will include but not necessarily be limited to cover boards, drift fence arrays, road surveys, and visual encounter surveys. Additionally, tissue samples will be obtained from selected amphibian and reptile species and examine for population genetics and species relationships. This effort will be in response to specific

questions of taxonomy as described in the published literature. Samples will be collected according to established techniques, and collecting will be conducted under the specifications of an NPS collecting permit. Reposition locations of samples will be determined prior to collecting. Interim summary reports (no more than five pages) or an NPS Investigator's Annual Report (IAR) will be provided every six months. Survey data, field notes, digital map of sampling locations (mapped using GPS if possible), and a final comprehensive report of findings, including suggestions for additional inventories, future monitoring needs for bats, reptiles and amphibians on the islands, and management recommendations, will be delivered to the Park within six months of project completion.

Task 2.10 – Stream/lagoon surveys for abundance and distribution of native and alien fishes at SAMO

FY 2003 Accomplishments:

a) A SAMO fish survey was funded in FY 2003 through the biological inventory program. However, the network requested and received permission from the Regional I&M Coordinator to move these funds ($20,000) to a cooperative agreement with the Resource Conservation District of the Santa Monica Mountains to assist with field survey work needed to complete the ongoing vegetation mapping at SAMO. The network has already documented at least 90% of native and exotic fish species in SAMO streams and lagoons through existing documentation and ongoing monitoring by other agencies. This project would have provided more detailed information on distribution and abundance.

b) The vegetation mapping project ran into financial difficulties in FY 2003 when the NPS Fire Management Office decided to discontinue funding. The Fire Office provided $191,000 to cover the cost of the field crew, but declined to provide funds for map digitization and crew support in FY 2004. Because maintaining field crew through their scheduled completion date (July 2004) is critical for the timely and cost-effective completion of the classification and map, we began to seek funds elsewhere—including redirecting the funds allocated for the fish survey. Although the stream/lagoon survey at SAMO was high enough priority to receive funding through the biological inventory program, park and network staff felt strongly that it was a higher priority to complete the vegetation map. This vegetation/fuels map for the Santa Monica Mountains will provide critical information for park fire management while following I&M vegetation mapping standards and procedures. The park and network continue to seek the remaining needed funding for the vegetation mapping from both NPS and outside sources.

Scheduled FY 2004 Activities and Products:
This project is currently unfunded. The network will seek outside funding to implement this project.

Task 2.11 – Survey intertidal and shallow (<40 m) subtidal for fishes (CABR and CHIS)

FY 2003 Accomplishments:

a) In FY 2003, a scope of work was developed and a contract was awarded to conduct a sub-tidal and intertidal fish inventory of the CABR rocky intertidal zone. The contract was awarded to Vantuna Research Group, Occidental College (Daniel J. Pondella, II and Matthew Craig). Work is scheduled to begin in fall 2003.

Scheduled FY 2004 Activities and Products:

b) A contractor (Daniel J. Pondella, II and Matthew Craig, Vantuna Research Group, Occidental College) will inventory intertidal and subtidal fish species at CABR. Beginning in January 2004, the contractor will conduct a series of surveys within the marine administration of CABR (approximately 0.4 km^2). The surveys will be designed to systematically sample during different tides, times of day, and seasons, over the period of one year. The primary product will be a vouchered species list that includes some basic habitat and abundance information for each species. Survey will be completed and final products (maps, species list, voucher specimens, photodocumentation) available in FY 2005.

c) No funding is available for the survey at CHIS and the network will seek outside funding to implement this project at CHIS.

Task 2.12 – Survey deepwater (40-400 m) for fishes (CHIS)

Scheduled FY 2004 Activities and Products:
This project is currently unfunded. The network will seek outside funding to implement this project.

B. Vital Signs Monitoring

Objective 3 – Hire and retain professional staff to support network I&M planning and implementation.

FY 2003 Accomplishments:

a) Dr. J. Lane Cameron continued as the network coordinator for the Mediterranean Coast Network.
b) Lena Lee, cartographic technician, was converted from a SAMO term position to a network data management position through the Student Cooperative Education Program (SCEP). She has assumed the duties and responsibilities of data manager for the network and will have primary responsibility for developing the network data management plan to be included in the completed network monitoring plan.
c) Tiffany Luas, biological technician, continued in a support capacity at CABR, assisting the network with planning and implementation of I&M activities—particularly the terrestrial reptile and amphibian monitoring.
d) Plans to hire a GS-11 water quality coordinator were put on hold until the network completes initial water quality monitoring data mining (report should be complete December, 2003) and holds a network workshop (scheduled for February 2004.)
e) Denise Kamradt continued to coordinate biological inventory activities. FY 2003 was the final year of I&M program funding for this function.

Scheduled FY 2004 Activities and Products:

f) The decision to hire or not hire a water quality coordinator will be postponed until after the completion of an assessment of past and ongoing water quality efforts in the network parks in the first quarter of FY 2004 and a water quality workshop scheduled for the second quarter of FY 2004. At this time the recommendations of the workshop participants will be factored into an overall strategy for meeting water quality monitoring objectives and a recommendation to the board of directors by the technical committee on whether or not to proceed with this hiring.
g) The network will develop a staffing plan for Vital Signs Monitoring as part of the Phase III report.
h) Denise Kamradt will continue to provide coordination and general oversight of inventory activities. No network funding is available and the time spent on this function (estimated 0.1 FTE) will be contributed from SAMO base funds.

Objective 4 – Develop and implement network organizational structure and decision-making processes that engage park technical staff and managers.

FY 2003 Accomplishments:

a) The Board of Directors and Technical committee as previous identified continue to function. Throughout the year the network board of directors met on three separate occasions, and the technical committee met six times. Additionally, members of the board and technical committee are in regular communications with network staff and are continuously apprised of network accomplishments as appropriate.

Scheduled FY 2004 Activities and Products:

b) With the network organization in essence complete it is expected that the excellent working relationship thus established will continue throughout the fiscal year and that the existing organization will allow all network goals for FY 2004 to be accomplished as planned.

Objective 5 – Implement and maintain an integrated GIS and data management program.

FY 2003 Accomplishments:

(a) Park-base lapse salary from the network Research Learning Center was obligated through cooperative agreement with the Resource Conservation District of the Santa Monica Mountains (RCD) for metadata development and population of dataset catalog.
(b) Database and field forms were modified for the exotic plant survey at SAMO based on similar inventory work in other networks.

Scheduled FY 2004 Activities and Products:

(c) A technician, hired through the RCD, will document priority GIS layers for each of the network parks according to federal standards. The project will also involve preparation of data for distribution through the NPS Internet GIS Clearinghouse and development of standard operating procedures for developing, maintaining, and updating GIS metadata.

(d) Professor Hong-lie Qiu at California State University, Los Angeles is principal investigator for a project to develop and organize water resource-related GIS data for the network. Tasks will include finding and acquiring data and metadata, producing maps for the network water quality monitoring workshop, integrating and analyzing tabular and spatial water resources and water quality data. A final report should be completed by December 2004. Funding was obligated in FY 2003 through the new Californian Cooperative Ecosystems Study Unit (CA-CESU). *(See also task 9.3)*
(e) As part of the Phase III Report, the network will produce a data management plan following guidance from the National I&M Program.
(f) The network will work with the National Invasive Species Coordinator to ensure database and field forms for the exotic plant survey at SAMO conform to national program expectations.
(g) The network I&M web site will be converted from ASP to HTML to conform to new I&M program guidelines. Content will be updated throughout the year as needed.

Objective 6 – Design an integrated network Vital Signs monitoring program.

FY 2003 Accomplishments:
a) The network is engaged in the phased approach to identify vital signs and to develop a network monitoring plan. The network monitoring program in FY 2003 was primarily devoted to preparing the Phase II report. The process of preparing the report fell upon the network coordinator with significant engagement of the technical committee and parks' natural resource management staff. The Phase II report was nearly completed by the end of the fiscal year and was delivered to the National and Regional I&M coordinators in mid-October FY 2004.
b) In conjunction with the USGS Western Ecological Research Center, monitoring protocols for terrestrial reptiles and amphibians and aquatic amphibians have been developed for implementation in network parks.
c) Network staff attended the Pacific West Region's network coordinators meeting, the data manager's workshop in Phoenix, AZ, and the national meeting of the networks in Lansdowne, VA. The network coordinator, who is duty stationed at Santa Monica Mountains, made more than six trips to Cabrillo National Monument and four trips to Channel Islands National Park. In November of FY 2003 the network coordinator participated in the semi-annual intertidal monitoring program at Cabrillo National Monument.
d) During this fiscal year the network sponsored vital signs workshops for Santa Monica Mountains National Recreation Area (December 2002) and Cabrillo National Monument (March 2003). Draft park/ecosystems conceptual models were reviewed by participants at both workshops. Comments received were incorporated into the final models for the network. Discussions with network partners throughout the year also contributed to the final format and content of network ecosystem conceptual models. Monitoring questions and candidate vital signs were proposed at the Santa Monica Mountains workshop. Monitoring questions and candidate vital signs that had been proposed for Cabrillo National Monument in January of 2000 were reviewed during the March workshop and a computer based exercise for ranking them was presented. During the ranking exercise participants felt the vital signs

as presented were too far removed from the context in which they were recommended and could not complete the ranking process. From this exercise the computer based ranking process to be applied to the network was modified to present a hierarchal approach to the candidate vital signs to facilitate their ranking. This hierarchy was based upon an increase in specificity that would provide a contextual reference for each candidate vital sign. These efforts culminated in a web based prioritization exercise that resulted in the selection and categorization of six vital sign vital signs for Santa Monica Mountains National Recreation Area and 12 for Cabrillo National Monument.

Scheduled FY 2004 Activities and Products:

e) The primary activities for the coming year will be related to the detailed design work needed to implement monitoring. The network will determine which of the selected vital signs can reasonably be monitored with available funds. For each of these Vital Signs, we will develop specific monitoring objectives, sampling protocols and a statistical sampling design, a plan for data management and analysis, and determine the type and content of various products such as reports and websites. This work will be captured in the Phase III report (the completed draft monitoring plan). The current schedule for our network requires this draft plan to be delivered to the national I&M coordinator in December of FY05. The network is currently developing a detailed work plan to ensure that the Phase III report and related activities are accomplished in a timely manner.

Objective 7 – Support ongoing inventory and monitoring activities consistent with Vital Signs. Conduct prototype monitoring program at CHIS. Implement network Vital Signs Monitoring.

Task 7.1 – Monitor terrestrial herpetofauna at CABR and SAMO.

FY 2003 Accomplishments:

a) Conducted monitoring of terrestrial reptiles and amphibians based on established protocols at CABR and SAMO. During FY 2003, the monitoring effort at SAMO was expanded into a region with larger, more remote core habitat areas. The expansion resulted in the detection of species not detected during the initial efforts—including Ensatina, patch-nosed snakes, and horned lizards. (To manage the sampling effort across the Santa Monica Mountains the park was divided into regions based on distinguishing habitat characteristics and degree of urban development. This allows for work to be organized by region and sites expanded into other regions as time, funding and personnel allow.)
b) Protocols for the ongoing terrestrial herpetofauna monitoring at CABR and SAMO were submitted to the National I&M Program for peer-review.
c) A report with recommendations for optimization of the reptile and amphibian sampling protocol at CABR was published by USGS. *(See IV. Report, Publications, and Presentations)*
d) In addition to leading the herpetofauna monitoring field work at SAMO, park biologist Gary Busteed completed his master's thesis (*(See IV. Report, Publications, and Presentations for full citation)* using monitoring data to examine reptile and amphibian presence and abundance in fragmented environments. Results of this study show significant differences in

the presence and abundance of certain species relative to urbanization and habitat fragmentation, particularly with wide-ranging snakes, such as rattlesnakes and striped racers, and some amphibians.

Scheduled FY 2004 Activities and Products:

e) The terrestrial herpetofauna work at CABR and SAMO will continue based on the protocol recently submitted to the National I&M Program and based on external statistical review of this protocol.

Task 7.2 – Stream assessment at SAMO.

FY 2003 Accomplishments:

a) NPS staff and partners have just completed the fourth year of a five-year inventory to assess the status of aquatic amphibian populations and physical/chemical stream characteristics in SAMO watersheds. We have seen an interesting spatial trend in streams sampled. As the level of urban association increases, we have found increased water inputs and the presence of non-native species (such as crayfish, sunfish and bass). The presence of the non-native species is also correlated with the absence of certain amphibian species (particularly newts) and a reduced abundance of Pacific treefrogs. At the end of the five-year "inventory," the existing protocol will be re-evaluated for use in the long-term vital signs monitoring program.
b) The protocol for the ongoing stream monitoring for stream characteristics and aquatic amphibians at SAMO was submitted to the National I&M Program for peer-review.

Scheduled FY 2004 Activities and Products:

c) The stream assessment work in SAMO will continue based on the protocol recently submitted to the National I&M Program.
d) The park and its cooperators (Resource Conservation District of the Santa Monica Mountains, U.S. Geological Survey and Pepperdine University) are working on a draft of a paper on aquatic amphibians to be submitted for peer review and publication.

Task 7.3 – Prototype monitoring program at CHIS.

FY 2003 Accomplishments:

a) CHIS carried out monitoring of kelp forest, rocky intertidal, seabirds, vegetation, weather, and land birds.
b) Upon review of weather data collection and data management protocol at CHIS, park staff and contractors have decided it didn't make sense to integrate weather data into the park database. The Western Region Climate Center is storing the parks weather data and makes it available on their web site (www.wrcc.dri.edu/channel_isl/index.html).
c) Work is ongoing with park staff to revise protocols for vegetation, sea bird, rocky-intertidal, and land bird monitoring.
d) Rat eradication was completed on Anacapa Island. Reptile, Amphibian, deer mouse, landbird, vegetation, and seabird monitoring data from Anacapa provided substantial environmental information for the environmental impact analysis for the project. Post-

eradication monitoring is being carried out by the park and partner organizations. We are already seeing a positive response to the removal of rats by landbirds, seabirds, deer mice, reptiles, and amphibians.

Scheduled FY 2004 Activities and Products:

e) Conduct prototype monitoring program.
f) Existing and new shrub density and size-class transect sample data were entered into a new database for Channel Islands National Park vegetation monitoring program transects, along with species data from new belt transects. The data are being used in collaboration with USGS-BRD statisticians to evaluate the sample design. Recommendations for sample design adjustments will be evaluated in a peer-review seminar in mid-2004.
g) Staff, in conjunction with USGS, are continuing to revise protocols for vegetation, sea bird, rocky-intertidal, and land bird monitoring. The revisions should be completed in 2004.

Task 7.4 – Other monitoring-related activities.

FY 2003 Accomplishments:

a) Using park-based funds augmented by support from the Cabrillo National Monument Foundation, CABR conducted monitoring of tidepools, vegetation communities, and air quality at CABR using protocols developed by CHIS prototype monitoring program. A limited amount of technician support for these programs was provided with I&M funds.
b) CABR eliminated a major data analysis backlog in its intertidal monitoring program with the help of a contractor who scored approximately 250 slides for species cover (funds obligated in FY 2002).
c) Vital Signs monitoring funds provided partial support for the exotic and rare plant inventories at SAMO. *(See Task 2.1)*

Scheduled FY 2004 Activities and Products:

d) With park-based funding, CABR will continue to monitor tidepools, vegetation communities, and air quality using protocols developed by CHIS prototype monitoring program.
e) Exotic and rare plant inventories will continue at SAMO through September 2004, largely supported by monitoring funds. *(See Task 2.1)*

Task 7.5 – Develop and support regional monitoring programs.

FY 2003 Accomplishments:

a) The CHIS kelp monitoring program continues to include San Clemente Island through contract with the US Navy. This partnership provides important financial support for the park's monitoring program.
b) Marine Protected Areas, protecting over 20% of park waters from harvest, were established in 2003. Data from the Kelp forest monitoring program was essential to highlighting declines in the marine ecosystem over the last twenty years and the need for a new approach to marine protection.
c) Analyses of data from a number of the CHIS monitoring protocols were reported at the George Wright Society Meeting. Additional posters and presentations are being prepared for the California Islands Symposium in December, 2003.

d) Sampling protocols for ongoing reptile and amphibian inventory/monitoring at CABR and SAMO followed those developed by Robert Fisher of the USGS, Biological Resources Division and will feed into a broad regional data base of reptile and amphibian distribution throughout mainland southern California.

Scheduled FY 2004 Activities and Products:

e) CHIS and CABR will continue to support and participate in MARINE, a regional program for rocky intertidal monitoring with seven other partners from the government, academic institutions, and the private sector as part of a monitoring group.
f) SAMO and CABR will continue to monitor reptiles and amphibians as part of a regional monitoring program throughout mainland southern California.

Objective 8 – Develop and implement strategies to share information with network parks, scientists, and others interested in the network's I&M program.

FY 2003 Accomplishments:

a) The network developed and published a public web site to publicize and post information about the network I&M program, including project results and reports. After internal review, the web site was made available to the public via the national I&M office in Fort Collins.
b) Network representatives participated in several regional and national I&M meetings. See publications section of this report for a list of presentations at NPS and professional meetings and conferences.

c) Scheduled FY 2004 Activities and Products:
d) Maintain the network I&M web site, posting additional reports and updating information as necessary.
e) Network representatives will continue to participate in regional and national I&M workshops and meetings and continue to produce presentations and publications for a variety of audiences.

Objective 9 – Design and implement network Water Quality Monitoring Program.

Task 9.1 – Summarize existing data and understanding.

FY 2003 Accomplishments:

a) A draft Water Quality Monitoring Data Compilation and Evaluation Report was received from a cooperator and is in final review. This report surveyed all freshwater monitoring efforts within or adjacent to network parks and marine waters within one mile of the coasts of network parks. The focus was on identifying all agencies or organizations conducting water quality monitoring and to collect information on the parameters being monitored, the frequency of monitoring, sample collection methods, data analysis procedures, and data storage procedures. Preparation of this report has been a cooperative effort between the Mediterranean Coast Network and the Resource Conservation District of the Santa Monica Mountains. Several iterations of the report have been reviewed by network staff and guidance on direction for completion provided.

b) The report also includes an overview of existing information on water quality in the network. Over 120 streams from the five USGS HUC watersheds that encompass or influence network park waters are listed as 303d impaired water bodies by the State of California. To date no information has been found that indicates any waters within these watersheds are listed as Outstanding Natural Resource Waters. The California 1998 305(b) report indicates that 19% or less of all water bodies in the Santa Monica Mountains meet all designated uses, there are insufficient data to categorize the water bodies of the Channel Islands, and even though San Diego Bay is considered to be the second most polluted bay in the United States, 80% or more of the water bodies in the San Diego Basin meet all designated uses.

c) Degraded benthic communities, sediment toxicity, dissolved copper, and coliform and enterococci bacterial contamination have resulted in 303d listing for the San Diego Bay Shoreline Point Loma Hydrological Area at the US Navy Submarine Base, the Shelter Island Yacht Basin, at Kellogg Street, and at the Shelter Island Shoreline Park. All these locations are within a few kilometers of the Cabrillo National Monument eastern shoreline and the intertidal resources around Point Loma on the western side of the peninsula.

d) The waters surrounding the islands of Channel Islands National Park have been listed as State Water Quality Protection Areas. Additionally, the California Coastal Commission has designated the marine waters around San Miguel, Santa Rosa, and Santa Cruz Islands as Critical Coastal Areas (CCAs) where water quality is threatened by new or expanding land uses.

Scheduled FY 2004 Activities and Products:

e) A draft of the Water Quality Monitoring Data Compilation and Evaluation Report will be completed by the end of December, 2003. A final report is expected in the second quarter of FY 2004.
d) A network-wide water quality monitoring workshop will be held in February of 2004. *(See Task 9.2)*
e) Professor Hong-lie Qiu at California State University, Los Angeles is principal investigator for a project to develop and organize water resource-related GIS data for the network. Tasks will include finding and acquiring data and metadata, producing maps for the network water quality monitoring workshop, integrating and analyzing tabular and spatial water resources and water quality data. A final report should be completed by December 2004. Funding was obligated in FY 2003 through the new Californian Cooperative Ecosystems Study Unit (CA-CESU). *(See also Objective 5)*

Task 9.2 – Design a network Water Quality Monitoring Program.

Scheduled FY 2004 Activities and Products:

a) A network-wide water quality monitoring workshop will be held in February of 2004. The objectives of the workshop will be to assess regional and local ongoing monitoring efforts, identify gaps and additional issues, and, within guidelines established by the NPS Water Resources Division, develop priorities for a network water quality monitoring program.

b) As part of the Phase III monitoring report, the network will develop a water quality monitoring plan including a strategy for monitoring core marine and freshwater water quality parameters.

c) The network will contract for assistance with the development of a marine water quality monitoring program for CABR.

Task 9.3 – Monitor stream biological and physical characteristics.

FY 2003 Accomplishments:

a) At SAMO, water quality monitoring funds supported field assessment and inventory of stream biological and physical characteristics as part of the aquatic amphibian monitoring program. Protocols for the ongoing monitoring were submitted for additional peer-review.
b) CHIS completed a report on a water quality monitoring project assessing vegetation and stream morphology on Santa Rosa Island with the goal of documenting changes in water quality since cattle were removed from the island in 1998. The report was given to the Central Coast Regional Water Quality Control Board as part of the Park's effort to rescind a Cleanup or Abatement Order. The State has not yet acted on the report. The report documents considerable recovery of riparian areas on Santa Rosa Island since the removal of cattle in 1998.

Scheduled FY 2004 Activities and Products:

c) Water Quality funds will be used at SAMO to continue the comprehensive stream/aquatic amphibian monitoring.
d) CHIS will contract a preliminary watershed-level hydrologic analysis of the Canada del Puerto drainage, Santa Cruz Island. This will include assessment of fluvial processess, stream morphology and sediment transport necessary for development of a restoration and monitoring plan for Prisoner's wetland, the largest tidal wetland on Santa Cruz Island.
e) SAMO will perform an assessment of the range of variability in hydrogen stable isotope composition found in water derived from local rainfall and water imported from outside the region and test procedures for determining the contribution of each of these water sources to streamflow based on isotope ratios. This is a preliminary study for a proposed project to perform a mountains-wide assessment of the degree to which the amount and seasonal availability of water in the Santa Monica Mountains has been altered by water imported by human activities.

C. Other Natural Resource Inventories

Objective 10 – Complete SAMO Vegetation/Fuels Map following I&M program standards, procedures and guidelines.

FY 2003 Accomplishments:

The vegetation/fuels map for the Santa Monica Mountains will provide critical information for park fire management while following I&M vegetation mapping standards and procedures.

Reconnaissance and photo interpretation work began in February and field surveys began in July, 2002. The digital map should be complete by the end of 2004. Todd Keeler-Wolf, Vegetation Ecologist, California Department of Fish and Game is developing the vegetation classification. Aerial Information Systems (AIS) is performing aerial photo interpretation and map automation. Field work is being performed by five NPS biotechnicians.

In FY 2003 work focused on collecting the field data necessary to create the vegetation and mapping classifications and in providing information needed by the photo interpreters for defining the "visual signatures" for each vegetation association. The field crew surveyed 2469 vegetation stands for classification purposes and 141 stands for use in accuracy assessments. The crew made an additional 798 stand observations in response to information requests from the photo interpreters. Using the data collected, an "80% final" vegetation classification was developed based on TWINSPAN and cluster analyses performed by NPS Fire Geographer, Robert Taylor. Much of the development of the mapping classification was also completed. Project Coordination was supplied by the park plant ecologist, John Tiszler.

The project ran into financial difficulties in FY 2003 when the NPS Fire Management Office decided to discontinue funding. The Fire Office provided $191,000 to cover the cost of the field crew, but declined to provide funds for map digitization and crew support in FY 2004. Because maintaining field crew through their scheduled completion date (July 2004) is critical for the timely and cost-effective completion of the classification and map, we began to seek funds elsewhere. We requested and received permission from the Region I&M Coordinator to move I&M funds, (including $20,000 designated for a SAMO fish inventory and $4,681 of the funds designated to backfill the inventory coordinator position) to a cooperative agreement with the Resource Conservation District of the Santa Monica Mountains to assist us with field survey work. We also sought and received $142,000 in funding from the Santa Monica Mountains Conservancy (SMMC) to support the field work in FY 2004. SAMO park staff were trained to fill in as needed.

Scheduled FY 2004 Activities and Products:
The draft mapping classification was completed in December 2003. Supported by a $142,000 grant from the Santa Monica Mountains Conservancy and park base funding, SAMO will complete field data collection and analysis for classification, refinement of photo interpretation and accuracy assessment of the map. We also hope to contract the remaining map automation. However, no funds have been identified for completing map digitization (estimated cost $214,000). To ensure the map is completed efficiently without additional costs resulting from an interruption of work, we also need to secure the funds for map digitization by the end of FY 2004 or the beginning FY 2005.

III. Staffing

Board of Directors

Woody Smeck, Superintendent, SAMO
Terry DiMattio, Superintendent, CABR
Russell Galipeau, Superintendent, CHIS

Ad Hoc Members:
J. Lane Cameron, Ph.D., Network Coordinator
Penelope Latham, Ph.D., I&M Coordinator, Pacific West Region

Science Advisory Committee

(TBA)

Network Technical Committee

Andrea Compton, Chief of Natural Resource Science, CABR
Kate Faulkner, Chief of Natural Resources, CHIS
Ray Sauvajot, Ph.D., Chief of Planning, Science, & Resource Management, SAMO
J. Lane Cameron, Ph.D., Network Coordinator
Denise Kamradt, Resource Information Program Manager, SAMO
Vacant (TBA), Network Water Quality Monitoring Coordinator
Lena Lee, Data Manager
Park Resource Staff

Network Inventory and Monitoring Staff

J. Lane Cameron, Ph.D., Network Coordinator
Denise Kamradt, Biological Inventory Coordinator (unfunded after FY 2003)
Vacant (TBA), Network Water Quality Monitoring Coordinator
Lena Lee, Data Manager
Tiffany Luas Duffield, Biological Technician
Tarja Sagar, Biological Technician
Catherine Schoonmaker, Biological Technician
Jeff Sikich, Biological Technician
Cassity Bromley, Biological Technician

IV. Reports, Publications and Presentations

Atkinson, A.J., R.N. Fisher, C.J. Rochester, and C.W. Brown. 2003. Sampling Design Optimization and Establishment of Baselines for Herpetofauna Arrays at the Point Loma Ecological Reserve. USGS Western Ecological Research Center, Sacramento, CA.

Brown C., and R.N. Fisher, 2002. Inventory and Management Needs Study of Point Loma Herpetofauna (Reptiles and Amphibians) With Comments on Mammals and Invertebrates, 2001. Prepared for National Park Service, Cabrillo National Monument. 33pp. [Technical Report]

Busteed, G. 2003. Effects of Habitat Fragmentation on Reptiles and Amphibians in Coastal Sage Scrub and Grassland Communities. Master's Thesis, California State University, Northridge.

Busteed, G. and S.P.D. Riley. 2003. Urban habitat fragmentation and its effects on reptiles and amphibians in coastal sage scrub and grassland communities. Presentation at George Wright Society Meeting, San Diego California.

Dunaway, M.E. and D. Richards. May 2003. MARINE, the Multi-Agency Rocky Intertidal Network, Partnerships Make it Happen. (Presentation given at Partnership for Environmental Stewardship-Resource Conservation for the Future. Phoenix, Arizona.)

Kushner, D. J., D. Lerma, and M. Donahue. 2001. Channel Islands National Park Kelp Forest Monitoring, 2000 Annual Report. Technical Report - CHIS-01-07

Kushner, D. J., D. Lerma, J. Shaffer, and B. Hajduczek 2001. Kelp Forest Monitoring, 1999 Annual Report. Technical Report-CHIS-01-05.

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Lerma, D. L. and D. V. Richards. 2002. Sand Beach and Coastal Lagoon Monitoring, Santa Rosa Island. 2000 Annual Report. Technical Report CHIS-2002-02

Martin, P.L., C.A. Schwemm, W. Perry and J.T. Ackerman. Nest occupancy and hatching success of Xantus's murrelets (*Synthliboramphus hypoleucus*) breeding on Santa Barbara Island, California during a twenty-year period. Sixth California Islands Symposium, Ventura, California, December 1-3, 2003.

McEachern, K. March, 2003. Rare plant research in the northern Channel Islands, California. Invited Seminar, U.S. Fish and Wildlife Service, Sacramento, CA.

McEachern, K. September, 2003. Vegetation releves and rare plant studies on Santa Cruz Island. The Nature Conservancy Santa Cruz Island Monitoring Scoping Workshop, Santa Barbara, CA.

McEachern, K., D. Rodriguez, T. Coonan, L. Dye. August, 2003. Expert panel review of Channel Islands National Park Vegetation and Landbird monitoring programs. National Park Service Inventory and Monitoring National Annual Meeting. Lansdowne, VA. (poster).

McEachern, K., K. Chess, M. Barmann, S. Junak. April, 2003. Monitoring ecological change on Santa Cruz Island as land use changes. George Wright Society Biennial Conference, San Diego, California.

Ng, S.J., J.W. Dole, R.M. Sauvajot, S.P.D. Riley, and T.J. Valone. 2004. Use of highway undercrossings by wildlife in southern California. Biological Conservation 115: 499-507.

Richards, D. V. and D. L. Lerma. 2002. Rocky Intertidal Monitoring, Channel Islands National Park, 1999 Annual Report. Technical Report CHIS-2002-03.

Richards, D. V. and M. E. Dunaway. April 2003. MARINE, Partnership for a Regional Perspective. (Poster presentation at George Wright Society Meeting, San Diego, California.)

Richards, D. V. January 2003. Black abalone, *Haliotis cracherodii*, struggling for survival at the California Channel Islands. (Poster presentation at the International Temperate Reef Symposium, Christchurch, New Zealand.)

Riley, S.P.D. and G. Busteed. 2003. Effects of urbanization on amphibians, exotic predators, and aquatic habitat in streams in southern California. Presentation at George Wright Society Meeting, San Diego California.

Riley, S.P.D., G. Busteed, L. Kats, T. Vandergon, L. Lee, R. Dagit, J. Kerby, R.N. Fisher, and R. M. Sauvajot. (In prep). Distribution and abundance of amphibians and exotic species in urban and natural streams in southern California. For submission to Conservation Biology.

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Schwemm, C.A. and P.L. Martin. Long-term trend analysis of deer mouse (*Peromyscus maniculatus elusus*) densities and Xantus's murrelet *(Synthliboramphus hypoleucus)*productivity, Santa Barbara Island, California. Sixth California Islands Symposium, Ventura, California, December 1-3, 2003.

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Stokes, D.C., C.S. Brehme, and R.N. Fisher. 2003. Bat Inventory of the Point Loma Peninsula Including the Cabrillo National Monument. U.S. Geological Survey Western Ecological Research Center. Sacramento, CA [Final Report]

V. Status of Park Vital Signs Monitoring

The following table shows the number of parks with ongoing and planned monitoring in the Mediterranean Coast Network. Parks with monitoring funded with both NRC and non-NRC funds are listed in both categories.

	Air Quality	Water Quality	Water Quantity	Geologic Resources	Plants	Animals	Land-scape Charac-teristics
Planning and Design							
# parks monitoring w/ NRC funding	0	3	1	2	2	2	2
# parks monitoring w/ other funding	1	3	1	0	1	1	0
Protocols Implemented							
# parks monitoring w/ NRC funding	0	0	0	0	0*	2	0
# parks monitoring w/ other funding	1	0	0	0	2	2	0
Analysis/Synthesis Available							
# parks monitoring w/ NRC funding	0	1	0	0	0	1	0
# parks monitoring w/ other funding	0	1	0	0	1	1	0

* Number incorrectly reported as "1" in previous reports. CABR and CHIS have implemented protocols for vegetation community monitoring, but neither are funded through the NRC.

VI. USGS Protocol Development and Monitoring-Related Research Needs

The primary activities for FY 2004 will be related to the detailed design work needed to implement monitoring. The network will determine which of its selected vital signs can reasonably be monitored with available funds. For each of these Vital Signs, in order of priority, the network will develop specific monitoring objectives, sampling protocols and a statistical sampling design, a plan for data management and analysis, and determine the type and content of various products such as reports and websites. The network will seek help from all available sources and additional research needs will likely be identified during the course of this effort. However, a preliminary evaluation of network needs indicates the USGS could potentially be of assistance in developing a comprehensive monitoring program for the following subset of Vital Signs:

Terrestrial Flora

1) Comprehensive vegetation monitoring program focused on the distribution and status of invasive exotic plants.
2) Native vegetation community compositions and structure. Monitoring will be implemented for specific communities as resources allow. CABR communities are included in the following prioritized list: Coastal Sage Scrub, Chaparral Community, Rare Plant Populations and Habitat, Native Grassland Community, Lichens, and Cryptobiotic Crusts. SAMO communities are prioritized as follows: coastal shrublands, riparian plant communities, oak woodlands, wetland communities, and native grasslands.

Intertidal Communities at CABR

Comprehensive monitoring plan focused on the following communities at CABR: Marine Vegetation, Marine Invertebrates, Fish, Intertidal Invertebrates, Marine Plankton.

Terrestrial Fauna

A comprehensive monitoring program focused on detecting change in (1) key faunal communities at CABR including: Terrestrial Herpetofauna, Exotic Animal Introductions, Meso-carnivores, Small Mammals, Terrestrial Invertebrates, Bats, Meso-herbivores and (2) avifaunal communities including: Native Bird Community, Breeding Raptors, Endangered, Threatened, Rare, & Sensitive, Resident Passerine Species, Migratory, and Diving and Shorebirds.

At SAMO, a monitoring program focused on faunal groups sensitive to effects of habitat fragmentation, urban encroachment, and habitat alteration. Vital signs address three levels of concern: species diversity within habitat fragments, animal movements within and between fragmented areas, and potential landscape-level distribution changes that occur in fragmented landscapes.

1) Species diversity of reptiles and terrestrial amphibians in selected habitats.
2) Distribution and movements of meso-carnivores, including bobcats, coyotes, and gray foxes, in and around fragmented areas.
3) Nest distribution and nesting success of raptors across fragmented landscapes.
4) Species diversity of resident and migratory bird species in selected habitats.

5) Species diversity of bats in selected habitats.

Aquatic Features and Processes at SAMO

1) Distribution and abundance of aquatic herpetofauna, including related measurements of habitat characteristics and basic water quality.
2) Comprehensive monitoring of water quality and other abiotic aquatic conditions.
3) Aquatic invertebrate distribution and abundance.

VII. Budget

Budget Narrative:

FY 2003
In FY 2003, the network received $170,000 from the NPS Service-wide I&M program for biological inventories. These funds were used to continue invasive exotic plant species, and rare and sensitive plant species inventories at all network parks. CABR contracted an intertidal fish inventory. A raptor inventory for both SAMO and CABR was also funded through contract. Funds were allocated for network coordination. With separate funding, SAMO initiated an inventory of small mammals. Funds originally budgeted for a fish survey at SAMO were redirected with the approval of the Regional I&M Coordinator when the high priority vegetation mapping project at SAMO ran into serious financial difficulties.

Vital Signs monitoring and water quality funding for 2003 ($302,000 and $76,000 respectively) was budgeted for salary for monitoring technicians for inventory/monitoring projects, a Network I&M Coordinator, a Network Data Manager and a Water Quality Monitoring Coordinator, equipment and supplies, and travel for monitoring workshops, regional and national program meetings, and general network staff travel.

Funds were generally spent as budgeted. However, the Water Quality Monitoring Coordinator was not hired (this position is expected to be filled in FY 2004) and water quality funds budgeted for salary were spent on surveys of stream characteristics at SAMO and a agreement through the CA-CESU to develop a water resources GIS database in FY 2004. Other water quality projects included completion of a Santa Rosa Island water quality report.

The 1992 base increase for the CHIS prototype monitoring program was $622,000. In FY 2003, about $722,000 was spent on the program, including about $100,000 of park funds. The funds were spent largely on salary for the program managers, field biologists and technicians, GIS support and administrative support. Approximately $92,000 was spent on operations, equipment, and travel.

Fire program funds were used to cover the cost of the field crew and field support for the vegetation mapping project at SAMO.

FY 2004
In FY 2003, the network will receive no new funds from the NPS Service-wide I&M program for biological inventories. Projects scheduled for FY 2004 in the Biological Inventory Study Plan are unfunded. The network will continue to seek additional funding sources to implement unfunded projects. Ongoing inventories will be supported with FY 2004 monitoring, park base, and regional project funds, as well as funds committed in earlier years through cooperative agreements and contracts.

The network will receive Vital Signs monitoring and water quality funding in FY 2004 ($302,000 and $76,000 respectively). I&M funding will be allocated toward salary for a

Network Coordinator, a Network Data Manager, monitoring technicians for inventory/monitoring projects at SAMO and CABR, a Water Quality Monitoring Coordinator, I&M related training and travel, and equipment and supplies. Remaining water quality monitoring funds will be spent on selected projects including development of a marine water quality monitoring plan and a watershed-level hydrologic assessment of a drainage on Santa Cruz Island.

The CHIS prototype monitoring budget will remain substantially the same for FY 2004.

Appendix 1: Summary of Major Accomplishments

The Mediterranean Coast Network (MEDN) is composed of three parks in coastal southern California: Cabrillo National Monument (CABR), Channel Islands National Park (CHIS), and Santa Monica Mountains National Recreation Area (SAMO). These parks protect and manage an increasingly rare example of a Mediterranean coastal ecosystem.

A. Biological Inventory

Objectives for Biological Inventories:

- Compile and evaluate existing data for each park and enter into NPS databases.
- Complete the documentation of 90% of vertebrate and vascular plant species in the parks and describe the distribution and relative abundance for species of special management concern through targeted field investigations.

Denise Kamradt continued to coordinate biological inventory activities. FY 2003 was the final year of funding for this function as well as all other specific inventory projects. However, inventory work will continue through cooperative agreements and contracts put in place in FY 2003 and earlier, other fund sources, and through use of vital signs monitoring funds to complete high priority inventories (e.g. SAMO exotic plant survey). Additionally, the network continues to seek funds from other sources to implement unfunded studies.

Monitoring staff have taken responsibility for maintaining NPSpecies data and updates have occurred on a regular basis as needed. Park-base lapse salary from the network Research Learning Center was obligated through cooperative agreement with the Resource Conservation District of the Santa Monica Mountains (RCD) for network GIS metadata development and population of dataset catalog.

Status of major inventory efforts:

Santa Monica Mountains Flora

The final report and database for the Santa Monica Mountains Flora was submitted by Dr.'s Gibson and Prigge of UCLA in July. The researchers compiled 36,000 plant records (collections and sightings) for the Santa Monica Mountains and Simi Hills.

The nearly ten-year backlog of unprocessed vascular plant voucher specimens for CHIS were organized, labels were made, the specimens were verified by the appropriate taxonomists, and the specimens were sent to the Santa Barbara Botanic Garden (SBBG) for accessioning. Duplicate specimens were sent to cooperating herbaria by SBBG. New finds, records for specimens not previously reported, and records for taxa not recently collected were added to the NPSpecies database.

Channel Islands Vegetation Mapping

The vegetation of Santa Cruz Island was sampled in 369 relevé plots during the 2002 and 2003 growing seasons. Objectives of the study are to develop a vegetation classification for the island, along with an assessment of the distribution and abundance of weedy exotic and native plants across communities and habitats. At each plot, data were collected on plant community type, stand size and adjacency; animal and anthropogenic disturbance; slope, aspect, elevation, slope shape and landscape position; cover of individual plant taxa, plant strata and substrates; and other taxa present within the stand outside of the plot area. Each plot was marked with an aluminum stake, locations were recorded with hand-held Garmin eTrex Vista Global Positioning System (GPS) units, and photographs of the plot, stand and approach routes were taken with digital cameras. The data are stored in MSAccess and ArcView databases at the Channel Islands National Park/USGS-BRD Field Station.

Rare, Threatened, & Endangered Plants and Exotic Invasive Plant Surveys

During 2003, one full-time and two part-time Biological Science Technicians surveyed a total of 33,500 acres within SAMO including 80% of major trails, 40% of major drainages, and adjacent wildland areas. These directed surveys have been supplemented by more generalized vegetation communities mapping. Two invasive species previously unreported from SAMO were found: *Centaurea repens* and *Chondrilla juncea*.

In the spring of 2003, a newly discovered plant at Cabrillo NM was identified as being one of the rarer ones in San Diego County. While surveying for and mapping rare plants in a project funded by the Natural Resource Challenge, Rod Dossey (Dossey & Associates) discovered an annual plant which he suspected could be one population of a species known from only a few locations on the mainland. After obtaining confirmation from the San Diego Natural History Museum, the plant was identified as the San Diego coastalcreeper (*Aphanisma blitoides*). This species is known from only one other location in San Diego County (M. Simpson, pers. comm. 2003) and otherwise has not been recently verified. There may be a few potential remnant populations farther north along the coast in the Los Angeles Basin; however, *A. blitoides* is confirmed on the Channel Islands (Navy and National Park Service, pers. comm.). A conservative estimate of the population located this year at Cabrillo NM is approximately 1,000 individuals. This is, by far, the largest known population on the mainland.

Bat Surveys

Through interagency agreement with the USGS-BRD, San Diego Field Station, a year-round survey for bat species was completed to determine which species forage at, migrate through, or reside on Point Loma (CABR). Methods included acoustic scouting surveys and roost surveys for potential bat roosting sites (historic structures, caves, etc.). The survey has found species foraging incidentally in Point Loma or tree roosters using the cemetery site. Four species, previously unknown from Point Loma were detected. A total of eight species have

now been recorded. A report including results, protocol, and recommendations has been submitted to the park.

SAMO staff, in cooperation with The Maturango Museum, sampled bat diversity and abundance at 22 different sites (some several times). Anabat detectors were used for acoustic sampling and mist nets were used to get animals in hand. While bat numbers at most sites have been low, we have captured eight species, including the first record of a red bat (*Lasarius borealis*) for the Santa Monica Mountains. In addition to the eight species captured, we have detected one additional species, and may see more as we begin to analyze sound files.

Breeding Raptor Surveys

The Breeding Raptor Inventory for SAMO and CABR was awarded to a private contractor in March, 2003. The contractor, Pete Bloom, and his technicians began field work shortly thereafter. Foot and road surveys for nest sites were conducted in all designated parkland. In addition, to assess cliff-nesting raptors in the Santa Monica Mountains, helicopter surveys were conducted for two days (approximately 10 hours) in May, 2002. Helicopter services and operations were managed by park staff. Data collected included nest location (GPS coordinates), species, nest structure (i.e. tree species), and presence of adults and/or young.

Community Classification for Vegetation Mapping

In FY 2003 work on the SAMO vegetation map focused on collecting the field data necessary to create the vegetation and mapping classifications and in providing information needed by the photo interpreters for defining the "visual signatures" for each vegetation association. The field crew surveyed 2469 vegetation stands for classification purposes and 141 stands for use in accuracy assessments. The crew made an additional 798 stand observations in response to information requests from the photo interpreters. Using the data collected, an "80% final" vegetation classification was developed based on TWINSPAN and cluster analyses performed by NPS Fire Geographer, Robert Taylor. Much of the development of the mapping classification was also completed. Project Coordination was supplied by the park plant ecologist, John Tiszler.

B. Vital Signs Monitoring

Objectives for Vital Signs Monitoring:

- Hire and retain professional staff to support network I&M planning and implementation.
- Develop and implement network organizational structure and decision-making processes that engage park technical staff and managers.
- Implement and maintain an integrated GIS and data management program.
- Design an integrated network Vital Signs monitoring program.
- Support ongoing inventory and monitoring activities consistent with Vital Signs.

- Conduct prototype monitoring program at CHIS. Implement network Vital Signs Monitoring.
- Develop and implement strategies to share information with network parks, scientists, and others interested in the network's I&M program.

Dr. J. Lane Cameron continued as the network coordinator for the Mediterranean Coast Network. Lena Lee, cartographic technician, was converted from a SAMO term position to a network data management position through the Student Cooperative Education Program (SCEP). She has assumed the duties and responsibilities of data manager for the network and will have primary responsibility for developing the network data management plan to be included in the completed network monitoring plan. Tiffany Luas, biological technician, continued in a support capacity at CABR, assisting the network with planning and implementation of I&M activities—particularly the terrestrial reptile and amphibian monitoring.

The network is engaged in the phased approach to identify vital signs and to develop a network monitoring plan. The network monitoring program in FY 2003 was primarily devoted to preparing the Phase II report. The process of preparing the report fell upon the network coordinator with significant engagement of the technical committee and parks' natural resource management staff. The Phase II report was nearly completed by the end of the fiscal year and was delivered to the National and Regional I&M coordinators in mid-October FY 2004.

Vital Signs Scoping

The network sponsored vital signs workshops for Santa Monica Mountains National Recreation Area (December 2002) and Cabrillo National Monument (March 2003). Draft park/ecosystems conceptual models were reviewed by participants at both workshops. Comments received were incorporated into the final models for the network. Discussions with network partners throughout the year also contributed to the final format and content of network ecosystem conceptual models. Monitoring questions and candidate vital signs were proposed at the Santa Monica Mountains workshop. Monitoring questions and candidate vital signs that had been proposed for Cabrillo National Monument in January of 2000 were reviewed during the March workshop and a computer based exercise for ranking them was presented. During the ranking exercise participants felt the vital signs as presented were too far removed from the context in which they were recommended and could not complete the ranking process. From this exercise the computer based ranking process to be applied to the network was modified to present a hierarchal approach to the candidate vital signs to facilitate their ranking. This hierarchy is based upon an increase in specificity that would provide a contextual reference for each candidate vital sign. These efforts culminated in a web based prioritization exercise that resulted in the selection and categorization of six vital signs for Santa Monica Mountains National Recreation Area and 12 for Cabrillo National Monument.

In conjunction with the USGS Western Ecological Research Center, monitoring protocols for terrestrial reptiles and amphibians and aquatic amphibians have been developed for implementation in CABR and SAMO. Protocols were submitted to the national I&M program

for peer review. In addition, a report with recommendations for optimization of the reptile and amphibian sampling protocol at CABR was published by USGS.

The network developed and published a public web site to publicize and post information about the MEDN I&M program, including project results and reports. After internal review, the web site was made available to the public via the national I&M office in Fort Collins.

C. Water Quality Monitoring

Additional Objectives for Water Quality Monitoring:

- Design and implement network Water Quality Monitoring Program

A draft Water Quality Monitoring Data Compilation and Evaluation Report for the network was received from a cooperator and is in final review. This report surveyed all freshwater monitoring efforts within or adjacent to network parks and marine waters within one mile of the coasts of network parks. The focus was on identifying all agencies or organizations conducting water quality monitoring and to collect information on the parameters being monitored, the frequency of monitoring, sample collection methods, data analysis procedures, and data storage procedures. Preparation of this report has been a cooperative effort between the Mediterranean Coast Network and the Resource Conservation District of the Santa Monica Mountains. Several iterations of the report have been reviewed by network staff and guidance on direction for completion provided.

Professor Hong-lie Qiu at California State University, Los Angeles is principal investigator for a project to develop and organize water resource-related GIS data for the network. Tasks will include finding and acquiring data and metadata, producing maps for the network water quality monitoring workshop, integrating and analyzing tabular and spatial water resources and water quality data. A final report should be completed by December 2004. Funding was obligated in FY 2003 through the new Californian Cooperative Ecosystems Study Unit (CA-CESU). *(See also task 9.3)*

CHIS completed a report on a water quality monitoring project assessing vegetation and stream morphology on Santa Rosa Island with the goal of documenting changes in water quality since cattle were removed from the island in 1998. The report was given to the Central Coast Regional Water Quality Control Board as part of the Park's effort to rescind a Cleanup or Abatement Order. The State has not yet acted on the report. The report documents considerable recovery of riparian areas on Santa Rosa Island since the removal of cattle in 1998.

A technician was hired through the RCD to document priority water resources-related GIS layers for each of the network parks according to federal standards. The project will also involve preparation of data for distribution through the NPS Internet GIS Clearinghouse and development of standard operating procedures for developing, maintaining, and updating GIS metadata.

Plans to hire a GS-11 water quality coordinator were put on hold until the network completes initial water quality monitoring data mining (report should be complete December, 2003) and holds a network workshop (scheduled for February 2004.)

Selected FY 2003 I&M Results and Highlights

The final report and database for the Santa Monica Mountains Flora was submitted by Dr.'s Gibson and Prigge of UCLA in July. The researchers compiled 36,000 plant records (collections and sightings) for the Santa Monica Mountains and Simi Hills.

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In the spring of 2003, a newly discovered plant at Cabrillo NM was identified as being one of the rarer ones in San Diego County. While surveying for and mapping rare plants in a project funded by the Natural Resource Challenge, Rod Dossey (Dossey & Associates) discovered an annual plant which he suspected could be one population of a species known from only a few locations on the mainland. After obtaining confirmation from the San Diego Natural History Museum, the plant was identified as the San Diego coastalcreeper (*Aphanisma blitoides*). This species is known from only one other location in San Diego County (M. Simpson, pers. comm. 2003) and otherwise has not been recently verified. There may be a few potential remnant populations farther north along the coast in the Los Angeles Basin; however, *A. blitoides* is confirmed on the Channel Islands (Navy and National Park Service, pers. comm.). A conservative estimate of the population located this year at Cabrillo NM is approximately 1,000 individuals. This is, by far, the largest known population on the mainland.

At CHIS, the USGS-BRD, Colorado Plateau Field Station, initiated a survey of reptiles and amphibians to collect and analyze population information on distribution, relative abundance, and habitat occurrence of amphibian and reptile species on the islands within the National Park. In the initial months of the survey, researchers have tentatively added three bat species to the Santa Rosa Island list. Previously, California Myotis was the only species known from Santa Rosa, but the cooperators had found a single Townsend's Big-eared Bat (*Corynorhinus townsendii*) in a cave in Lobo Canyon during earlier work. Additions from this year's survey work are Mexican Free-tailed Bat (*Tadarida brasiliensis*) and Hoary Bat (*Lasiurus cinereus*). These species may be migrants on the island or there could be small local populations.

Researchers should be able to determine the status of the populations in surveys planned for FY 2004. Additionally, a new snake was discovered on Santa Rosa Island. Researchers are not certain of the species, but believe it to be the Aquatic Garter Snake (*Thamnophis atratus*). At the next opportunity, researchers will take a blood sample for genetic testing—both to confirm the species' identity, and to evaluate its relationship to the mainland form.

During this fiscal year the network sponsored well-attended workshops for Santa Monica Mountains National Recreation Area (December 2002) and Cabrillo National Monument (March 2003) to solicit input from scientific and management partners on vital signs for a network monitoring program. Discussions with network partners throughout the year also contributed to the final format and content of network ecosystem conceptual models. This effort culminated in a web based prioritization exercise that resulted in the selection and categorization of six vital signs for Santa Monica Mountains National Recreation Area and 12 for Cabrillo National Monument.

Rat eradication was completed on Anacapa Island (CHIS). Reptile, Amphibian, deer mouse, landbird, vegetation, and seabird monitoring data from Anacapa provided substantial environmental information for the environmental impact analysis for the project. Post-eradication monitoring is being carried out by the park and partner organizations. We are already seeing a positive response to the removal of rats by landbirds, seabirds, deer mice, reptiles, and amphibians.

NPS biologist, Gary Busteed, completed his master's thesis at California State University Northridge, examining monitoring data from fragmented environments at SAMO. Results included significant differences in the presence and abundance of certain species relative to urbanization and habitat fragmentation, particularly with wide-ranging snakes, such as rattlesnakes and striped racers, and some amphibians. Project partners include California State Parks, Rancho Simi Recreation District, Conejo Open Space Conservation Agency, and the City of Thousand Oaks.

NPS staff and partners have just completed the fourth year of a five-year inventory to assess the status of aquatic amphibian populations in SAMO watersheds. Results thus far have demonstrated an interesting spatial trend in streams sampled. As the level of urban association increases, researchers found increased water inputs along with the presence of non-native species (such as crayfish, sunfish and bass). The presence of the non-native species is also correlated with the absence of certain amphibian species (particularly newts) and a reduced abundance of Pacific treefrogs.

Marine Protected Areas, protecting over 20% of park waters from harvest, were established in 2003. Data from the CHIS Kelp forest monitoring program was essential to highlighting declines in the marine ecosystem over the last twenty years and the need for a new approach to marine protection.

The network developed and published a public web site to publicize and post information about the MEDN I&M program, including project results and reports. After internal review, the web site was made available to the public via the national I&M office in Fort Collins.

CHIS completed a report on a water quality monitoring project assessing vegetation and stream morphology on Santa Rosa Island with the goal of documenting changes in water quality since cattle were removed from the island in 1998. The report was prepared for the California Central Coast Regional Water Quality Control Board as part of the Park's effort to rescind a Cleanup or Abatement Order. The report documents considerable recovery of riparian areas on Santa Rosa Island since the removal of cattle in 1998.